Free and Open Source Software
Overview and Preliminary Guidelines
for the Canadian Forces

David Demers

Robert Charpentier, Richard Carbone

R et D pour la défense
Canada

Defence R&D
Canada

Canada

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- ## Summary and perspectives for the CF (5 min)

FOSS : Free and Open Source Software

GoC: Government of Canada

Study Context

- Challenging Context
  - *A very complex reality… with many biased perspectives*
  - *Changing very rapidly*
  - *Huge diversity in the target audience*

Summary Report on FOSS

- Synthesis – *High-level vision*
  - *Systematically referring to credible, up-to-date, rigorous reports*

- 3-Cycle validation process
  - *Cycle 1 – DRDC Valcartier*
  - *Cycle 2 – DRDC Corporate HQ*
  - *Cycle 3 – DND/CF and OGD*

DRDC: Defence R&D Canada

DND/CF: Department of National Defence / Canadian Forces

OGD: Other Government Departments

DRDC- Advisory Team on FOSS
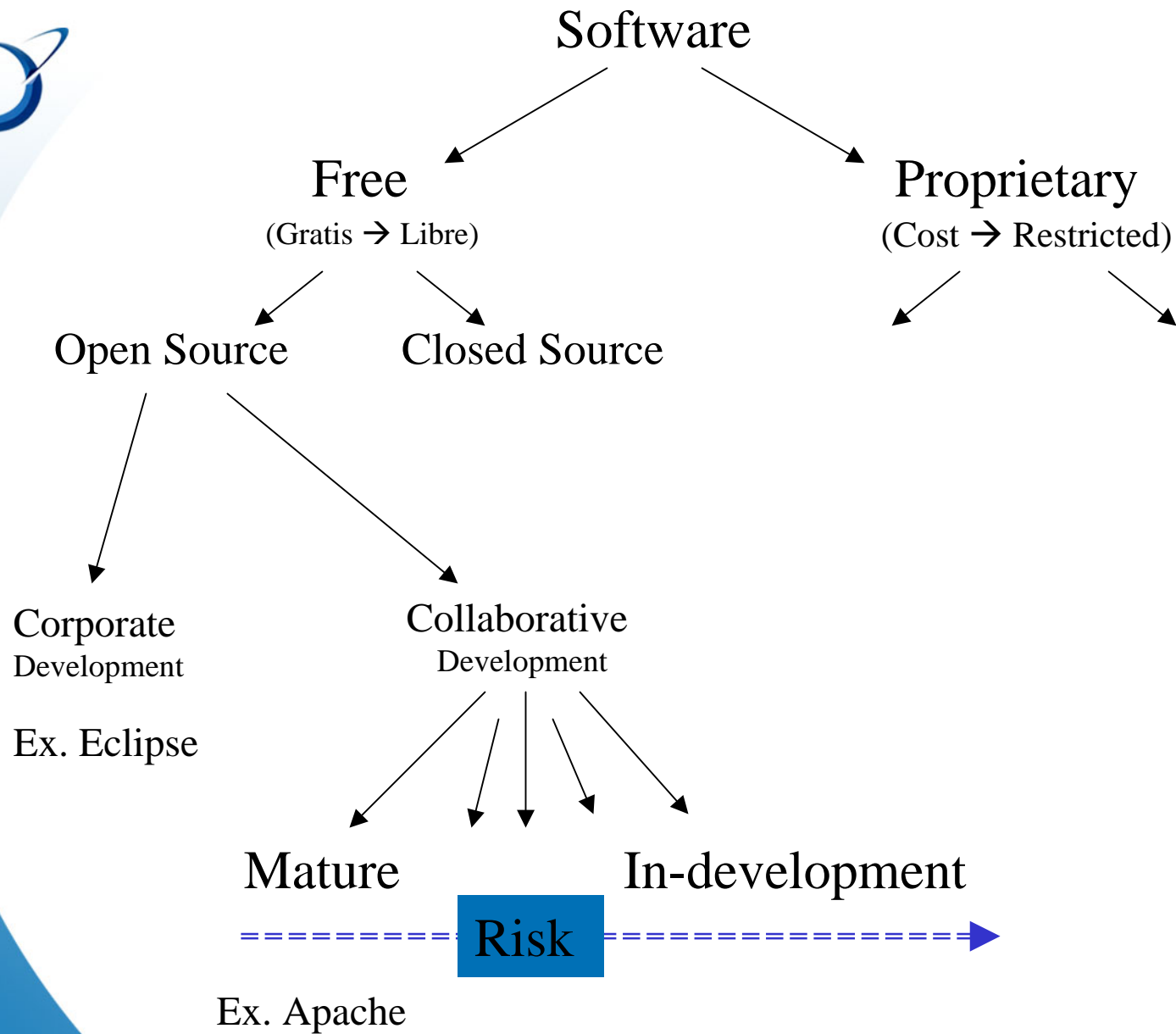

Robert Charpentier, Richard Carbone, Paul-André Côté,
David Demers, Martin Salois, Lt Stéphane Fortin,
Dr Denis Poussart (U. Laval), Max Blanchet (CGI), Bertrand Couture (DMR)

Archive & Report Status

- Archive :

    ~ 287 technical reports evaluated

- Reports :

    ~ 124 references used in the report

    ~ 17 topics discussed (~ 59 main statements)

    ~ 394 selected FOSS introduced

Software

Free
(Gratis → Libre)

Proprietary
(Cost → Restricted)

Open Source

Closed Source

Corporate
Development

Ex. Eclipse

Collaborative
Development

Mature

Ex. Apache

Risk

In-development

Report Overview

Part #1 – Executive Introduction to FOSS

FOSS Evolution

- Approximately 115,000 projects registered
  - more than half of them are inactive (or duplicates)
  - 115-150 software applications on the secure/mature lists

- Collaborative development evolved in a very efficient process
  - Well-structured
  - Systematic code review and testing
  - Very fast bug fixing

FOSS Benefits

- Mature FOSS repeatedly suggested many benefits
  - Huge diversity of software
  - High flexibility and scalability through code editing
  - High reliability and security through code review
  - One-order of magnitude faster release rate than COTS products
  - Rapid "customizing" through code reuse
  - High degree of compliance with open standards
  - Lifetime extension of FOSS-based systems without lock-in

COTS: Commercial-Off-The-Shelf

Current Concerns

- Version control may be more complex *(evolving)*

- System maintainability requires more local resources

- Higher technical skill needed from system administrators

- May offer less integration between applications and less user-friendliness *(evolving)*

FOSS around the World

- European Union is actively adopting FOSS
  - *United Kingdom – policy and partial migration plan*
  - *Germany, France & Sweden – policy and migration up to desktop*
  - *24 countries reviewing policies (as of June 2003)*

- Latin American, African, Oceanian and Asian countries are also moving toward FOSS in varying degrees

- Main motivations:
  - *Direct cost savings*
  - *Less economic losses at the national level compared with COTS imports*
  - *Improve national IT expertise in software*

IT: Information Technology

FOSS in the USA

- FOSS originated largely in the USA and is still strong

- Many large American corporations contribute to FOSS
    - *IBM, Hewlett-Packard, Sun Microsystems, Silicon Graphics etc*

- Some US government initiatives contribute to FOSS
    - *NSA offered SE Linux (Security Enhanced Linux)*
    - *NTA sponsored an impressive Geomatics project (OSPR)*
    - *NASA used collaborative FOSS development for Mars exploration*
    - *….*

- Adopting a strong FOSS policy could be problematic for the US Government since the software industry strongly supports the US economy

NSA = National Security Agency

NTA = National Technology Alliance

OSPR = Open Source Prototype Research = Geomatics

FOSS in Canada

- Canada appeared to be behind the curve in FOSS adoption

- Some comprehensive initiatives can be found in the education and health sectors

- GoC position on FOSS adopted on 17th May 2004
  - No barriers to procurement
  - Ensuring that GoC staff are aware of the options available
  - Collaboration between departments is encouraged

GoC: Government of Canada

FOSS and Software Security

- Access to source code greatly eases security enforcement

- Other key advantages include:

  - « Leaner and meaner » software systems

  - Possible source code enrichment

  - Increased code diversity in software ecosystem

- Increased risks to manage:

  - Internal expertise to develop and maintain

  - Lack of imputability when software is developed via internet collaboration

Authors' Synthesis

- FOSS should not be considered as a panacea --

  but appears to be a credible and productive approach

  - *Cost-effective in many instances*
  - *Offering a good maturity, flexibility, high productivity*

Report Overview

Part # 2 – Proposed Way-Ahead for GoC

Guiding Principles for a Way-Ahead

- FOSS represents a real and credible opportunity for GoC

- Diversity in supplies is preferable
    (Custom Software, COTS and FOSS)

- Open Standards and specifications lead to system interoperability

- Evaluation of FOSS must be done on a case-by-case basis

COTS: Commercial-Off-The-Shelf
FOSS: Free and Open Source Software

Proposed Way-Ahead for GoC

- *Promote progressive FOSS adoption in GoC*
  - *Inform project leaders of potential FOSS benefits*
  - *Provide navigation aids to help identify suitable FOSS*
  - *Provide guidelines to assess FOSS in context*
  - *Train personnel to interpret licenses and estimate cost*
- Consider *FOSS-based solutions in some RFP and*

  Choose « best value on the market » with technology neutrality

  http://publiservice.cio-dpi.gc.ca/fap-paf/oss-ll/foss-llo/foss-llo00_e.asp

RFP: Request for proposal

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Part # 3– GoC Guidelines to Assess FOSS

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Recommended Evaluation Steps

- Define the application context

- Identify candidates (FOSS and COTS)

- Compare side-by-side the 3-4 best options

- Perform an in-depth code analysis if needed

- Seek approval from local management and client

- Document the lessons learned

  - *An evaluation spreadsheet is proposed*

  - *A simple cost model is offered*

  - *http://publiservice.cio-dpi.gc.ca/fap-paf/oss-ll/foss-llo/foss-llo00_e.asp*

Ingredients for Success

- A good working product

- Led by commited leaders

- Providing a general community service

- Supported by developers who are also its users

Report Overview

Part #4 – Catalogue of Selected FOSS

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High-Quality FOSS Lists

- GRAS: Generally Recognized As Secure *(115 FOSS – MITRE / DoD)*

- GRAM: Generally Recognized As Mature *(39 FOSS - Wheeler)*

- IDA: Interchange Data Administrations *(multiple FOSS - EU)*

- DRDC: Includes scientific FOSS *(± 394 FOSS – DRDC)*

Summary

- Importance of FOSS will be increasing

    for most Government departments including DND/CF

- Pratical guidelines proposed

    for comparing FOSS and COTS software in project context

- Numerous navigation aids included in the report

- French version available

Next Steps

- Quality and Security assessment of FOSS
  - *Tools and methodologies to verify & validate C and C++ software*
    - Report for GoC project leaders and security architects
  - *Tools and methodologies to verify & validate Java software*
    - Report for GoC project leaders and security architects

- FOSS licenses and other legal issues
  - Practical information needed to support FOSS adoption in GoC

- Cost estimation
  - Practical information needed to support FOSS adoption in GoC

Issues Requiring Some Attention by the GoC

- Expertise for system development and maintenance

  i.e. more reliance on internal resources – often scarce

- Lack of imputability

  when software is developed via internet collaboration

- Fragmentation of our computer base

  compatibility with existing systems and databases to maintain

- Duplication of certification efforts

  centralized software certification and GoC pre-qualified list of FOSS

Issues Requiring Some Attention by the CF

- Good technology in some cases; criteria to clarify

- Maintain interoperability with our allies moving to FOSS

  - List of trusted sources in preparation

- Assess threat of FOSS having offensive capabilities

  - List of offensive FOSS being built

For comments :

FOSS@drdc-rddc.gc.ca

http://www.cio-dpi.gc.ca/fap-paf/oss-ll/oss-ll_e.asp

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